

WHAT IS CLAIMED IS:

- 1 1. An isolated DNA molecule selected from the group consisting of:
- 2 A. the DNA sequence of FIGURE 1 (SEQ ID NO:1);
- 3 B. the DNA sequence of FIGURE 2 (SEQ ID NO:3);
- 4 C. the DNA sequence of FIGURE 20A (SEQ ID NO:22);
- 5 D. DNA sequences that hybridize to any of the foregoing DNA sequences under
- 6 standard hybridization conditions;
- 7 E. DNA sequences that code on expression for an amino acid sequence encoded
- 8 by any of the foregoing DNA sequences;
- 9 F. degenerate variants thereof;
- 10 G. alleles thereof; and
- H. hybridizable fragments thereof.
- 1 2. An isolated nucleic acid molecule, which nucleic acid molecule encodes an
- 2 ob polypeptide, which polypeptide is characterized by having about 145 to about
- 3 167 amino acid residues, being expressed predominantly by adipocytes, and being
- capable of inducing a reduction of body weight in an animal.
- 1 3. The isolated nucleic acid of Claim 2, wherein the ob polypeptide has an
- 2 amino acid sequence selected from the group consisting of the sequence depicted in:
- 3 a) Figure 1 (SEQ ID NO:2),
- 4 b) Figure 1 from amino acid number 22 to amino acid number 167, Figure 3
- 5 (SEQ ID NO:4),
- 6 c) Figure 3 from amino acid number 22 to amino acid number 167,
- 7 d) Figure 5 (SEQ ID NO:5),
- 8 e) Figure 5 from amino acid number 22 to amino acid number 166,
- 9 f) Figure 6 (SEQ ID NO:6), and
- g) Figure 6 from amino acid number 22 to amino acid number 166.

Do not  
ENTER  
CLAIMS

JPM  
2 APR 1999

- 1 4. The nucleic acid molecule of Claim 2 selected from the group consisting of  
DNA and RNA.
- 1 5. The nucleic acid molecule of Claim 2, which has a sequence as shown in  
Figure 1 (SEQ ID NO:1) from nucleotide number 46 to nucleotide number 550.
- 1 6. The nucleic acid molecule of Claim 2, which has a sequence as shown in  
Figure 2 (SEQ ID NO:2) from nucleotide number 46 to nucleotide number 550.
7. The nucleic acid molecule of Claim 1 which is detectably labeled.
8. A vector, which comprises the DNA molecule of Claim 1.
- 1 9. An expression vector, which comprises the nucleic acid molecule of Claim  
2, operatively associated with an expression control sequence.
- 1 10. A nucleic acid hybridizable to a non-coding region of an *ob* nucleic acid,  
2 which non-coding region is selected from the group consisting of an intron, a 5'  
non-coding region, and a 3' non-coding region.
- 1 11. A probe capable of screening for a nucleic acid encoding an *ob* polypeptide,  
which probe is a labeled DNA molecule of Claim 1.
12. A unicellular host transfected with a cloning vector of Claim 8.
13. A unicellular host transfected with an expression vector of Claim 9.
- 1 14. The unicellular host of Claim 13 wherein the unicellular host is selected  
2 from the group consisting of *E. coli*, *Pseudomonas*, *Bacillus*, *Streptomyces*, *Pichia*

- 3 yeasts, CHO, R1.1, B-W, L-M, COS 1, COS 7, BSC1, BSC40, and BMT10 cells,  
plant cells, insect cells, and human cells in tissue culture.
- 1 15. An oligonucleotide primer for amplifying human genomic DNA encoding an  
ob polypeptide.
- 1 16. The oligonucleotide of Claim 15, which is selected from the group consisting  
2 of
- 3 HOB 1gF 5'-CCCAAGAAGCCCATCCTG-3' (SEQ ID NO:26)  
4 HOB 1gR 5'-GACTATCTGGGTCCAGTGCC-3' (SEQ ID NO:27)  
5 HOB 2gF 5'-CCACATGCTGAGCACTTGTT-3' (SEQ ID NO:28)  
HOB 2gR 5'-CTTCAATCCTGGAGATACCTGG-3' (SEQ ID NO:29).
- 1 17. An ob polypeptide, which polypeptide is encoded by the DNA molecule of  
Claim 1.
- 1 18. An ob polypeptide, which polypeptide is characterized by having about 145  
2 to about 167 amino acid residues, being expressed predominantly by adipocytes,  
and being capable of inducing a reduction of body weight in an animal.
- 1 19. The ob polypeptide of Claim 18 which has the amino acid sequence shown  
in Figure 1 (SEQ ID NO:2) or Figure 5 (SEQ ID NO:5).
- 1 20. The ob polypeptide of Claim 19 which has the amino acid sequence shown  
in Figure 3 (SEQ ID NO:4) or Figure 6 (SEQ ID NO:6).
- 1 21. An immunogenic fragment of an ob polypeptide, which polypeptide is  
2 characterized by having about 160 amino acid residues, being expressed  
3 predominantly by adipocytes, and being capable of inducing a reduction of body  
weight in an animal.

1 22. The immunogenic fragment of an ob polypeptide of Claim 21, which is  
2 selected from the group consisting of  
3 Val-Pro-Ile-Gln-Lys-Val-Gln-Asp-Asp-Thr-Lys-Thr-Leu-Ile-Lys-Thr (SEQ ID  
4 NO:18);  
5 Leu-His-Pro-Ile-Leu-Ser-Leu-Ser-Lys-Met-Asp-Gln-Thr-Leu-Ala (SEQ ID  
6 NO:19);  
7 Ser-Lys-Ser-Cys-Ser-Leu-Pro-Gln-Thr-Ser-Gly-Leu-Gln-Lys-Pro-Glu-Ser-Leu-  
8 Asp (SEQ ID NO:20); and  
9 Ser-Arg-Leu-Gln-Gly-Ser-Leu-Gln-Asp-Ile-Leu-Gln-Gln-Leu-Asp-Val-Ser-Pro-  
Glu-Cys (SEQ ID NO:21).

1 23. A derivative of a polypeptide according to claim 17 or 18 having one or  
more chemical moieties attached thereto.

1 24. The derivative of claim 15 wherein the chemical moiety is a water soluble  
polymer.

1 25. The derivative of claim 16 wherein the water soluble polymer is  
polyethylene glycol.

1 26. An analog of an ob polypeptide having the amino acid sequence of human ob  
2 depicted in Figure 4, which analog is selected from the group consisting of:  
3 A. serine residue at position 53 substituted with glycine, alanine, valine,  
4 cysteine, methionine, or threonine;  
5 B. serine residue at position 98 substituted with glycine, alanine, valine,  
6 cysteine, methionine, or threonine;  
7 C. arginine residue at position number 92 substituted with asparagine, lysine,  
8 histidine, glutamine, glutamic acid, aspartic acid, serine, threonine, methionine, or  
9 cysteine;  
10 D. one or more of residues 121 to 128 substituted with glycines or alanines;

- 11 E. deletion of one or more amino acid residues at positions 121-128;
- 12 F. a loop structure formed by the disulfide bond that forms between cysteine
- 13 residues 117 and 167;
- 14 G. amino acids from residue 22 to 53;
- 15 H. amino acids from residue 61 to amino acid residue 116;
- 16 I. amino acids from residue 61 to amino acid residue 167;
- 17 J. aspartic acid at one or more of residues 29, 30, 44, 61, 76, 100, and 106
- 18 substituted with glutamic acid; and
- K. one or more isoleucine residues substituted with leucine.

1 27. A method for preparing an ob polypeptide comprising:

- 2 A. culturing a unicellular host of Claim 12 or 13 under conditions that provide
- 3 for expression of the ob polypeptide; and
- 4 B. recovering the expressed ob polypeptide.

28. The method according to Claim 27 wherein the host cell is a bacterium.

29. The method according to Claim 27, wherein the host cell is a yeast.

1 30. The method according to Claim 27, further comprising:

- 2 C. chromatographing the polypeptide on a Ni-chelation column; and
- D. purifying the polypeptide by gel filtration.

1 31. The method according to Claim 30, further comprising after step C and

2 before step D chromatographing the ob polypeptide on a strong cation exchanger

3 column.

32. An antibody to the ob polypeptide of Claim 17.

33. An antibody to the ob polypeptide of Claim 18.

- 1 34. A method for preparing an antibody to an ob polypeptide, comprising:
  - 2 A. conjugating the immunogenic fragment of an ob polypeptide of Claim 19 to
  - 3 a carrier protein;
  - 4 B. immunizing a host animal with the ob polypeptide fragment-carrier protein
  - 5 conjugate of step A admixed with an adjuvant; and
  - 6 C. obtaining antibody from the immunized host animal.
- 7 35. The antibody of Claim 32, 33, or 34 which is a polyclonal antibody.
- 8 36. The antibody of Claim 32, 33, or 34 which is a monoclonal antibody.
- 1 37. An immortal cell line that produces a monoclonal antibody according to  
2 Claim 36.
- 3 38. The antibody of Claim 32, 33, or 34 labeled with a detectable label.
- 4 39. A method for measuring the presence of an ob polypeptide in a sample,
  - 5 comprising:
    - 6 A. contacting a sample suspected of containing an ob polypeptide with an
    - 7 antibody that binds to the ob polypeptide under conditions which allow for the
    - 8 formation of reaction complexes comprising the antibody and the ob polypeptide,
    - 9 B. detecting the formation of reaction complexes comprising the antibody and
    - 10 ob polypeptide in the sample;
    - 11 in which detection of the formation of reaction complexes indicates the presence of
    - 12 ob polypeptide in the sample.
- 1 40. The method of Claim 39 in which the antibody is bound to a solid phase  
2 support.

1 41. A method for evaluating the level of ob polypeptide in a biological sample  
2 comprising  
3 A. detecting the formation of reaction complexes in a biological sample  
4 according to the method of Claim 30; and  
5 B. evaluating the amount of reaction complexes formed, which amount of  
6 reaction complexes corresponds to the level of ob polypeptide in the biological  
sample.

1 42. A method for detecting or diagnosing the presence of a disease associated  
2 with elevated or decreased levels of ob polypeptide in a mammalian subject  
3 comprising:  
4 A. evaluating the level of ob polypeptide in a biological sample from a  
5 mammalian subject according to Claim 41; and  
6 B. comparing the level detected in step (A) to a level of ob polypeptide present  
7 in normals or in the subject at an earlier time;  
8 in which an increase in the level of ob polypeptide as compared to normal levels  
9 indicates a disease associated with elevated levels of ob polypeptide, and decreased  
10 level of ob polypeptide as compared to normal levels indicates a disease associated  
with decreased levels of ob polypeptide.

1 43. A method for monitoring a therapeutic treatment of a disease associated with  
2 elevated or decreased levels of ob polypeptide in a mammalian subject comprising  
3 evaluating the levels of ob polypeptide in a series of biological samples obtained at  
4 different time points from a mammalian subject undergoing a therapeutic treatment  
5 for a disease associated with elevated or decreased levels of ob polypeptide  
according to the method of Claim 41.

1 44. A method for changing the body weight of a mammal comprising inhibiting  
the expression of an ob polypeptide encoded by a nucleic acid of Claim 2.

- 1 45. The method according to Claim 44 comprising expressing an antisense  
2 nucleic acid molecule hybridizable to a nucleic acid that expresses the ob  
3 polypeptide, expressing a ribozyme that cleaves a nucleic acid that expresses the ob  
4 polypeptide, administering an antisense nucleic acid molecule hybridizable to a  
5 nucleic acid that expresses the ob polypeptide, and administering a ribozyme that  
cleaves a nucleic acid that expresses the ob polypeptide.
- 1 46. A pharmaceutical composition for reducing body weight of an animal  
2 comprising the ob polypeptide of Claim 17 and a pharmaceutically acceptable  
carrier.
- 1 47. A pharmaceutical composition for reducing body weight of an animal  
2 comprising the ob polypeptide of Claim 18 and a pharmaceutically acceptable  
carrier.
- 1 48. A method for reducing the body weight of an animal comprising  
2 administering an amount of a pharmaceutical composition of Claim 47 effective to  
3 reduce the body weight of an animal to an animal believed to be in need of  
decreased body weight.
- 1 49. The method according to Claim 48 wherein the animal is a human, and the  
ob polypeptide is human ob polypeptide.
- 1 50. A method for reducing the body weight of a mammal comprising increasing  
the expression of a protein encoded by the nucleic acid of Claim 2.
- 1 51. A pharmaceutical composition for increasing the body weight of an animal  
comprising an antagonist of an ob polypeptide.



- 1 52. The pharmaceutical composition of Claim 51, wherein the antagonist is  
2 selected from the group consisting of an antibody that binds to and neutralizes the  
3 activity of ob polypeptide, a fragment of the ob polypeptide that binds to but does  
not activate the ob receptor, and a small molecule antagonist of the ob polypeptide.
- 1 53. A method for increasing the body weight of an animal comprising  
2 administering an amount of the pharmaceutical composition of Claim 51 effective to  
3 cause an increase in body weight to an animal believed to be in need of increased  
body weight.